

1 B99

Model 81 TERMALINE

Coaxial Load Resistor

INSTALLATION - OPERATION

MAINTENANCE

UTL
LIBRARY No. 0094

Copy #2



BIRD

INSTRUCTION BOOK

MP MASTER



MA34318



Model 81 TERMALINE

Coaxial Load Resistor

-

INSTALLATION - OPERATION

MAINTENANCE

Instruction Sheet
for
INSTALLATION - OPERATION - MAINTENANCE
Model 81 TERMALINE
Coaxial Load Resistor

GENERAL - The Model 81 is a general purpose coaxial resistor for use with 50/51.5 ohm RF transmission lines. It has a continuous load capacity of 50 watts up to 45°C ambient temperature. At 50 ohms characteristic impedance, the VSWR of these terminations does not exceed 1.1 to 1.0 from 0 to 1000 mc, and 1.2 to 1.0 from 1000 to 4000 mc. The Model 81 Resistor therefore provides a very low reflection (non-radiating) line termination. This is useful as a substitute antenna to assist in tuning RF transmitters within its range and for other routine maintenance or special checks on coaxial transmission equipment. The TERMALINE is equipped with a Female Type N input connector.

ELECTRICAL CHARACTERISTICS - The Load Resistors are designed to match the most common high frequency transmission media; i.e. 50 ohm coaxial lines. The impedance in the VSWR (voltage standing wave ratio) language of such transmission, is quite independent of frequency and almost purely resistive. Below 50 mc, the input impedance of the coaxial load is very nearly a pure resistance equal to the DC resistance value. The production tolerance on the DC resistance of these equipments is maintained $\pm 3\%$ from the nominal 50 ohms.

DESCRIPTION - This equipment consists essentially of a carbon-film-on-ceramic cylindrical resistor immersed in a dielectric coolant. The cooling oil and the tapered conical resistor housing provide the proper electrical characteristics for the coaxial line termination. By convection, the oil carries the generated heat to the walls of the coolant case, which transmit it to the outside air. The case is rectilinear, with the conical portion of the resistor unit (with input connector) at the front of the box. A hinged carrying handle is provided on top.

INSTALLATION - The load resistor should be operated only with the axis of the input connector horizontal, preferably with the case standing upright (the handle on top). If the case is laid on (either) side, the termination properties of the resistor are not impaired, but the load power capacity is reduced. The equipment may be placed on any convenient surface, making sure there is at least several inches of free air space around and above the unit. Do not operate with the input connector pointing up, as the input section of the resistor will be air filled and the RF impedance badly disturbed - see Coolant section.

MAINTENANCE - This equipment is rugged and simple, requiring only nominal routine care. Keep the case dusted off and the electrical parts free of dirt and grime. If the Connector contacts or faces should become dirty, wipe off with a little dry solvent (Inhibisol or its equivalent, or trichlorethylene) on a cotton swab stick. Exercise caution to avoid fumes. If the Resistor Unit needs to be changed, place the load on its back end, with the connector end up. Loosen and remove the screw on the clamping band at the top of the front disc. Remove clamping band and carefully lift the Resistor Unit straight up, allowing the oil to drip back into the tank. Inspect the O-ring on the resistor housing just inside the sloped clamping flange. Do not re-use the O-ring unless it is in fine condition. Replace resistor by reversing the foregoing procedure. Be sure the O-ring is properly placed, and tighten the clamping screw securely. After putting the assembled load resistor in a horizontal position, inspect for oil leakage.

The resistor is held in its housing by mechanical means. It may be changed by special techniques, but this work is critical and is not recommended for field personnel. The Load Resistor Assembly #76007 should be changed as a unit.

INPUT CONNECTOR - The Model 81 Load Resistor is supplied with a Female N Type Connector. This input jack mates with the standard Male N Plugs enabling the equipment to be directly coupled to RG-8/U and RG-9B/U (or RG-213/U and RG-214/U) type cables.

COOLANT - The Dummy Load is factory filled at room temperature with precisely one quart of coolant, GE type 10C Transil dielectric oil, Bird part #5030. Under normal conditions, the quantity of coolant will remain constant. However, if it should become necessary to add coolant, position the unit with the filler plug (located on the lower surface of the front cone) facing up. Remove filler plug, empty the existing liquid into a clean container, then pour in exactly one quart of coolant, and replace plug (with a O-ring seal). The quantity of coolant oil is important, over or under-filling will endanger the unit. If the unit is filled with the front cone removed (as in Maintenance Section above), one quart will bring the fluid level to about 7/8 to 15/16 inches from the edge of the lip on tank aperture.

Use only GE type 10C (Bird part #5030); the characteristic of this coolant are important with respect to rf impedance and power rating of the load resistor.

TRANSMITTER LOADING - As a dummy load for transmitters, the Model 81 TERMALINE provides a standardized load resistance, while conveniently dissipating power within its rating. Used with RG-8A/U cables, the standard load impedance becomes available at the end of any desired cable length. For most transmitter loading work, RG-8A/U and similar 51 to 52 ohm cables can be used with UG-21D/U without concern as to the exact constants of the particular piece of cable. However, for close measurement work with slotted line, it should be realized that flexible, solid dielectric cables vary in characteristic impedance, not only from piece to piece, but from point to point along a single length. Rigid fittings must be properly tapered, and of uniform Z_0 throughout, if the low VSWR of the Model 81 is to be measured.

Coaxwitch Model 74 or 72-2 is useful for rapid comparison of load impedance, say when it is desired to compare an antenna to the Model 81 TERMALINE.

INSERTION LOSS MEASUREMENT AND VSWR MEASUREMENT OF INSERTION COMPONENTS - The Model 81 TERMALINE has proven useful as a termination for connectors being investigated for insertion VSWR properties, by comparison of VSWR's measured with and without the connector in the slotted line circuit.

For insertion loss measurement on filters, cables, etc., a coupling device may be connected to the termaline input, in such a manner that a Model 43 THRULINE Wattmeter on a receiver crystal or bolometer may be used as an output indicator. With proper care as to the insertion VSWR of the coupler, loss measurements may be made under almost ideal termination conditions.

As a termination, the Model 81 is quite useful in checking the VSWR of filters. In pass bands particularly, the termination must be correct to get useful answers.

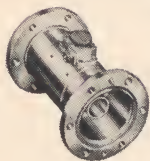
LIST OF REPLACEABLE PARTS

<u>Qty.</u>	<u>Name</u>	<u>Part No.</u>
1	RF Load Resistor Assembly	76007
1	O-Ring, Seal - Linear #11-226	75065
1	Clamping Band Assembly	750254
1 qt.	Coolant - GE Transil Oil	5030
1	Filler Plug	75040
1	O-Ring, Seal - Linear #11-012	81141

Bird Electronic Corporation
Cleveland 39, Ohio

THRULINE

DIRECTIONAL RF WATTMETERS



Model 43 and Rigid Line Series
Direct reading . . . "thru" type measure forward or reflected power in complete systems under operating conditions . . . inserted between transmitter and antenna or load . . . full scale power and frequency range determined by plug-in elements.



50-Ohm nominal

Model	Connectors	ELEMENTS	
		Frequency (mc)	Power Ranges
43	QC Type*	2-30	50, 100, 250, 500, 1000 watts
		25-60; 50-125; 100-250; 200-250; 400-1000	5, 10, 25, 50, 100, 250, 500, 1000 watts
4712	1 1/8" EIA	2-30; 25-60;	.25, .5, 1, 2.5, 5KW
4715*	Flanged	50-125; 100-250; 200-500; 400-1000	
460	3 1/8" EIA	2-30; 25-60;	1, 2.5, 5, 10, 25KW
4610*	Flanged	50-125; 100-250; 200-500; 400-1000	
4902	6 1/8" EIA	2-30; 25-60;	2.5, 5, 10, 25, 50KW
	Flanged	50-125; 100-250; 200-500; 400-1000	
4910	9" Flanged	Per Customer Specifications	

*Double Socket Thruline for monitoring of forward and reflected power.

to measure rf power... **THRULINE**

TERMALINE ...to absorb rf power

Model	Freq. Range	Max. Power	Power Range Scales	Input Connector
6254	30-500 mc	1 w	25, 50, 100, 250, 500 and 1000 milliwatts	Female "BNC"
61	30-500 mc	80 w	Choice of two compatible scales, Lowest .5 watt	Female "N"
611	30-500 mc	60 w	Dual Range 0-15/60 w	Female "N"
612	30-500 mc	80 w	Dual Range 0-20/80 w	Female "N"
67	30-500 mc	500 w	0-25/100/500 watt	Female "N"
694	2-30 mc	1000 w	0/1000 watt	QC Type*
6835	30-500 mc	1200 w	0-120/600/1200 watt	QC Type*
67C*	30-500 mc	2500 w	0-100/500/2500 watt	Female "N"

*Water Cooled on High Range

Model	74	718	72R	72-2
Positions	Six	Eight	Reversing Switch	Two
Coaxial Circuits	One	One	Two	Two
Connector	Type N female connectors are standard on all models to receive UG-21/U series plug. Use adapters with other cables and connectors.			

Model	Max. Power	Frequency Range	*Max. VSWR	Input Connector
80 Series	5 w	0-4 KMC	1.25	Male or Female, N; C; BNC
80 A	20 w	0-2 KMC	1.2	Female "N"
8130	50 w	0-4 KMC	1.2	QC Type*
81B	80 w	0-4 KMC	1.2	Female "N"
8135	150 w	0-4 KMC	1.2	QC Type*
82A	500 w	0-3.3 KMC	1.2	Female "N"
8201	500 w	0-2.5 KMC	1.25	QC Type*
8833	1000 w	0-2.5 KMC	1.25	QC Type*
8813	1000 w	0-2.0 KMC	1.25	1 1/8" EIA Flanged
888	1200 w	0-2.0 KMC	1.25	3 1/8" EIA Flanged
8890	2500 w	0-2.5 KMC	1.25	QC Type*
82C**	2500 w	0-3.3 KMC	1.2	Female "N"
8950***	5000 w	0-2.5 KMC	1.25	QC Type*

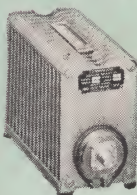
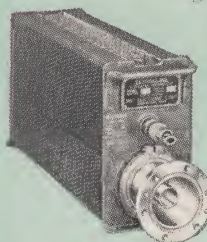
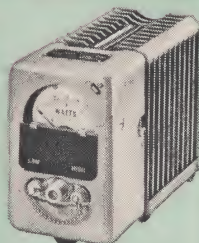
Other water-cooled loads up to 50KW can be supplied.

*VSWR is 1.1 or less to 1000 mc on all models — with "N" connectors.

Water Cooled *Forced Air

★QC TYPE: Bird Quick-Change Connector, designed for rapid change.

Available in following types:
Female or Male N, C, HN, BNC, LC, LT, UHF, and 1/8" EIA flanged.



TERMALINE

RF ABSORPTION WATTMETERS

Portable — Non Radiating

Portable . . . direct reading . . . non-radiating "load" type wattmeter . . . used in field or laboratory to measure and absorb power . . . accuracy $\pm 5\%$ of full scale . . . VSWR 1.1 to 1 maximum over operating range.

COAXWITCH

COAXIAL SELECTOR SWITCHES

Dependable, manually-operated switches for selecting antennas, receivers, transmitters or other apparatus with coaxial connections. Ideal as a system component in electronic equipment where reliable, repeated channel switching is required; pull knob, rotate, and push in to make contact.

TERMALINE

RF LOAD RESISTOR

Quick-Change Connectors

Reflection-free terminations for 50-ohm coaxial lines . . . low VSWR . . . non-radiating . . . water cooled rating 2500 W to 50 KW . . . air cooled rating to 2.5 KW . . . forced air to 5 KW. Quick-Change Connectors (*QC Type) available on many models.

COAXIAL RF FILTERS

Our extensive engineering and manufacturing facilities are at your command for the custom design and manufacture of filters to your specifications. Intelligent design, skillfull manufacture assure you of highest performance and reliability. New miniature filters, as light as five ozs., are available and can be produced in quantity.

Complete Specifications on request.



BIRD

ELECTRONIC CORPORATION

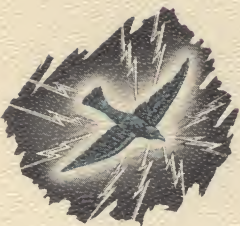
30303 Aurora Rd., Cleveland 39 (Solon), Ohio

Churchill 8-1200 TWX CGN FS 679

Western Representative:

VAN GROOS COMPANY, Woodland Hills, Calif.





BIRD

ELECTRONIC CORPORATION

**30303 Aurora Road - Cleveland 39,
(Solon) Ohio - Phone Churchill 8-1200**

MP MASTER



MA34318



52688